Prospects for Resilience

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BOOK REVIEW

Prospects for Resilience: Insights from New York City's Jamaica Bay

Eric W. Sanderson, William D. Solecki, John R. Waldman, and Adam S. Parris (2016) Island Press, Washington D.C., 304 pages, $80.00 (hardcover), $40.00 (paperback), ISBN 9781610917339. Also available as E-book.

On 29 October 2012, Hurricane Sandy raged over New York City (NYC). The storm drove massive waves, accompanied by heavy rains and a tide amplified by a full moon, and flooded the NYC coasts. More than 150 people were killed, 380,000 buildings were damaged or destroyed, tens of thousands of people were displaced. The total economic damage has been estimated at $60 billion. Jamaica Bay, an urban estuary located at the south side of Brooklyn and Queens, was strongly hit by the hurricane and areas around the bay were flooded with several meters of seawater. It destroyed many houses and brought a lot of misery to the neighborhoods that already suffered from poverty, high unemployment rates, and tensions between communities.

Jamaica Bay is a truly urban estuary. It is surrounded and intersected by parkways and borders directly on the JFK International Airport. Nevertheless, the estuary is a habitat for nearly 100 fish species, more than 300 bird species, and many reptiles, amphibians, and mammals. It provides seasonal or year-round support to more than 200 endangered and threatened species. More than 450 plant species can be found, including rare and endangered species but also invasive species. The shores of Jamaica Bay function as major stopover along the Atlantic Flyway. It is not surprising that the area is a highly popular recreational target of citizens for birdwatching, fishing, and sailing against the background of the Manhattan skyline.

Storms like Sandy are not anymore "once in a lifetime" events and urban coastal areas all over the world are increasingly vulnerable because of worsening climate conditions and sea level rising. It is increasingly recognized that the concept of resilience, which refers to the capacity of a system to recover from shocks and adapt to changing drivers and disturbances, should be a core perspective in urban landscape management. In this context, ecological restoration is important as it may reduce coastal vulnerability and enhance resilience to future disasters like Hurricane Sandy by, for example restoring dunes, wetlands, and river courses. However, because urban estuaries are often highly populated centers of commercial activity, such restoration efforts have to take into account social issues and choices.

In response to Sandy, the City of New York and the National Park Service concluded that repairing and compensating damage by disasters such as this hurricane was not enough and that a wider approach was needed. They established the Science and Resilience Institute at Jamaica Bay in order to produce integrated knowledge to increase biodiversity, human prosperity, and adaptive capacity of the New York City communities. The Institute is a partnership of academic institutes, governmental agencies, nongovernmental organizations, and community groups. This volume, *Prospects for Resilience*, is one of the first products and has more than 50 authors divided over 12 chapters. The main question is to understand what resilience means in Jamaica Bay.

Chapter 1 describes the background of the volume as summarized above and Chapter 2 explains the main concepts of resilience based on system theory and especially on adaptive cycle and panarchy theory, put forward, among others, by Gunderson and Holling (2002). According to this line of thought, many natural and social systems are characterized by life cycle consisting of growth and a subsequent stabilization of both the internal structure and the productivity of the system. However, such a situation will not endure forever and may collapse, triggered by an external disturbance. This gives the system the opportunity to reorganize itself and to start the cycle again. The panarchy concept holds that this cycle is affected by other natural and/or social systems, often operating on quite different scales of space and time. These theories constitute the idea of social–ecological systems, and accordingly, Chapter 3 characterizes Jamaica Bay estuary as such a social–ecological system in which we find strongly connected and interacting ecological, climate, economic, and governance subsystems. Managing this area should therefore also focus on the interactions between ecological and social-economic drivers such as population growth and composition, institutions, governance, social (in)equity, and cohesion.

The second part of the book focuses on the dynamics and history of the Jamaica Bay estuary as a social–ecological system. Chapter 4 describes Jamaica Bay as a biophysical system that has undergone strong changes since the European colonization in the early seventeenth century. For example, average water depth has increased by channel dredging from 1 m prior to modern development to nearly 5 m nowadays, making this tidal zone, in combination with expected sea level rising, increasingly vulnerable to hurricanes and storms. Chapter 5 describes historic and current social drivers of ecological change and biodiversity in the Jamaica Bay by, for example population growth and the development of infrastructures. Chapter 6 focuses on how the different neighborhoods

have experienced the Sandy flooding. Many people, often in relation to their sociodemographic position, were not prepared for such an event and lacked knowledge on the resilience role of natural landscapes. However, the hurricane and its aftermath have strongly shaped public's current understanding of resilience.

The third part of the book concerns the tools and techniques of resilience research. Chapter 7 deals with monitoring and main criteria for resilience indicators: policy relevance, analytical soundness, and measurability. Accordingly, these criteria are applied to indicators such as climate hazards, water and sediment quality, land use, biodiversity, and community resilience. Integration and modeling are important tools for this kind of research and Chapter 8 considers computational models for resilience research. Although models simplify reality, they make it possible to transcend disciplinary boundaries through simulations and scenario research connecting biophysical, socioeconomic, and ecosystem approaches. Especially open source modeling is acknowledged because it can involve both experts and stakeholders. Chapter 9 gives an overview of the role of green infrastructures: ecologically valuable land (e.g. gardens, parks, wetlands, beaches, waterways) that may enhance urban resilience by reducing run-offs and pollutants and mitigating the effects of hot summers. They offer storm protection and provide recreation opportunities and spaces for wildlife. Protection, restoration, and creation of green infrastructures in urban areas appear often to be cost-effective in the long run. Chapter 10 deals with decision science and aims to develop the contours of decision theory in the context of resilience. It especially stresses the need to integrate and coproduce insights from science, stakeholders, and governments and to explicate values in order to develop feasible management actions. Social learning is a key element of resilience management and involves not only the adjustment of actions or interventions but also willingness to change objects, and even the ability to adapt governmental systems.

The final part of the book on prospects for resilience consists of two chapters. Chapter 11 builds on Chapter 6 and stresses that community resilience is driven by quite different factors as compared to purely ecological resilience. Building up resilience capacity in urban settings implies education on both social and ecological components, communication among neighborhoods and with the government, and the necessity of self-advocacy in order to deal with emergency situations. Finally, Chapter 12 summarizes and draws some conclusions. It stresses that the chapters in the volume function at the interface of science, policy, and practice but that the Jamaica Bay resilience project is just at its beginning. Resilience practice is always in a state of "becoming" and some issues will always remain: how to deal with different values, how to monitor, what are the best resilience indicator values, how to organize the disciplinary boundaries and interfaces, and so on.

This book is a welcome contribution to social–ecological system restoration especially of coastal areas. It demonstrates how complex ecological restoration will become by taking into account social drivers and issues. Although there is some overlap in the different chapters and some of the chapters suffer from a rather summarizing writing style, the volume is rich in information and background literature. Although the book focuses mainly on Jamaica Bay and Hurricane Sandy, it may inspire many researchers in other urban areas to organize resilience research in urban settings. Research on social–ecological systems requires the use of boundary crossing concepts and theories. The concept of resilience indeed functions as such a boundary concept in the book by connecting insights from social and ecological disciplines. Adaptive cycle and panarchy theories, considered in the beginning of the book, may also deliver such boundary crossing insights, but are not elaborated in the subsequent chapters. Social and ecological issues remain being considered from rather classical disciplinary perspectives. However, it is also clear that the book is just a first step and that resilience science is, just as resilience practice, a learning process in which a lot of steps have still to be taken. The volume will surely contribute to the way forward.

LITERATURE CITED

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